

# PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

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| Applicant's or agent's file reference<br>35420-PCT  | <b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) |   |
| International application No.<br>PCT/US03/26484   | International filing date (day/month/year)<br>21 August 2003 (21.08.2003)   | Priority date (day/month/year)<br>21 August 2002 (21.08.2002) |
| International Patent Classification (IPC) or national classification and IPC<br>IPC(7): G01J 03/46; G01N 21/25 and US Cl.: 356/402, 407, 409, 414 |   |   |
| Applicant<br>THE TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK  |   |   |

- This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 3 sheets, including this cover sheet.  
☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.

- This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

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|---|---|
| Date of submission of the demand<br>02 March 2004 (02.03.2004)  | Date of completion of this report<br>07 September 2004 (07.09.2004)   |
| Name and mailing address of the IPEA/US<br>Mail Stop PCT, Attn: IPEA/US<br>Commissioner for Patents<br>P.O. Box 1450<br>Alexandria, Virginia 22313-1450<br>Facsimile No. (703) 305-3230 | Authorized officer<br>Gregory J. Toatley, Jr.<br>Telephone No. 571-272-1585<br>Jean Proctor<br>Paralegal Specialist |

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US03/26484

## I. Basis of the report

## 1. With regard to the elements of the international application:\*

- ☐ the international application as originally filed.
- ☒ the description:  
pages 1-16 as originally filed  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_.
- ☒ the claims:  
pages NONE, as originally filed  
pages NONE, as amended (together with any statement) under Article 19  
pages NONE, filed with the demand  
pages 17 and 18, filed with the letter of 26 July 2004.
- ☒ the drawings:  
pages 1-9, as originally filed  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_.
- ☐ the sequence listing part of the description:  
pages NONE, as originally filed  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_.

## 2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language \_\_\_\_\_ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

## 3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

- ☐ the description, pages NONE
- ☒ the claims, Nos. 11-18
- ☐ the drawings, sheets/fig NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\*

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International Application No.  
PCT/US03/26484

## V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. STATEMENT

|                               |                    |     |
|-------------------------------|--------------------|-----|
| Novelty (N)                   | Claims <u>1-10</u> | YES |
|                               | Claims <u>NONE</u> | NO  |
| Inventive Step (IS)           | Claims <u>1-10</u> | YES |
|                               | Claims <u>NONE</u> | NO  |
| Industrial Applicability (IA) | Claims <u>1-10</u> | YES |
|                               | Claims <u>NONE</u> | NO  |

### 2. CITATIONS AND EXPLANATIONS

1. Claim 1 meets the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest a method for quantitative determination of arsenic concentration in a water sample in a field wherein the water sample comprises phosphates, the method comprising the steps of adding a reducing agent to a first sample aliquot, adding a color reagent to the first sample aliquot and a second sample aliquot, and, using measured light absorbances for the two aliquots to calculate arsenic concentration in the water sample, in combination with the rest of the limitations of claim 1.

2. Claims 2-10 meet the criteria set out in PCT Article 33(2)-(3), because they are dependent on claim 1 or an intermediate claim.

#### NEW CITATIONS

US 4,797,000 A (CURTIS) 10 January 1989, see abstract, col.4, line 22 - col.8, line 68).

## CLAIMS:

1. A method for quantitative determination of arsenic concentration in a water sample in the field, wherein the water sample comprises phosphates, the method comprising:
  - 5 (a) preparing a first and a second sample aliquot;
  - (b) adding a reducing agent to a first sample aliquot to reduce arsenic in the aliquot to an arsenite state;
  - (c) adding a color reagent to the first and second sample aliquots, whereby phosphates in the first aliquot and both phosphates and arsenates in the second aliquot  
10 are converted into color complexes;
  - (d) using optical probes to measure light absorbance of the color complexes formed in each aliquot; and
  - (e) using the measured light absorbances for the two aliquots to calculate the arsenic concentration in the groundwater sample,  
15 wherein the optical probes are disposed in a portable colorimeter.
2. The method of claim 1, further comprising the step of adding an oxidizing agent to the second sample aliquot to oxidize arsenic in the aliquot to an arsenate state.  
20
3. The method of claim 1 wherein the optical probe comprises infrared radiation having a wavelength of about 880 nm.
4. The method of claim 1 wherein the color complexes comprise molybdenum  
25 blue.
5. The method of claim 4 wherein the color reagent comprises potassium antimonyl tartrate, wherein the water sample is a groundwater sample, and wherein the proportion of color reagents added to groundwater sample aliquots is increased by  
30 about a factor of 10 over conventional Johnson and Pilson formulations used for seawater analysis.

6. The method of claim 1 wherein an optical probe comprises:  
a cuvette to hold a sample aliquot;  
a light emitting diode which is configured to radiate light on to the cuvette;  
a photodetector for measuring the intensity of light transmitted through the  
5 held sample aliquot; and  
an electronic component to process the voltage output of the photo detector.
7. The method of claim 1 wherein using optical probes comprises using a pair of  
optical probes that are disposed in a dual-beam arrangement in the portable  
10 colorimeter, and using a first probe in the pair to measure light absorbance in the first  
sample aliquot, and the second probe in the pair to measure light absorbance in the  
second sample aliquot.
8. The method of claim 7 wherein the responses of the optical probes in the pair  
15 are normalized with respect to each other.
9. The method of claim 1 wherein the light absorbance in the first and the second  
sample aliquots is measured sequentially.
- 20 10. The method of claim 1 wherein the light absorbance in the first and second  
sample aliquots is measured concurrently.